What is Claimed Is:

1   1.   A communications system comprising:

2   stratospheric platform having a payload controller and a phased

3 array antenna having a plurality of elements;

4   a gateway station in communication with said stratospheric

5 platform, said gateway station scaling the plurality of elements to form a

6 reconfigurable plurality of beams, said gateway station communicating a control

7 signal to the stratospheric platform to communicate a scaling of elements

8 having adaptive interference rejection.

1   2.   A communications system as recited in claim 1, wherein

2 the payload controller comprises a demultiplexer for receiving control signals.

1   3.   A communications system as recited in claim 2, wherein

2 the demultiplexer generates a plurality of element control signals.

1   4.   A system as recited in claim 3, wherein the element

2 control signals are coupled to an RF feed, the RF feed is coupled to elements of

3 said phased array antenna.

1   5.   A system as recited in claim 1, wherein the gateway

2 station comprises a beam generator for generating beam signals.

1   6.   A system as recited in claim 1, wherein the gateway

2 station comprises a digital beam former circuit having a digital beam former, an

3 adaptive beam processor coupled to user position files, said digital beam former

4 circuit coupled to the beam generator, the digital beam former generates a

5 plurality of element control signals, said adaptive beam processor generating

6 said adaptive interference rejection.

1   7.   A system as recited in claim 1, wherein said gateway
2 station further comprises a multiplexer/demultiplexer.

1   8.   A system as recited in claim 7, wherein said
2 multiplexer/demultiplexer comprises a code division multiplexer/demultiplexer.

1   9.   A system as recited in claim 1, wherein said ground
2 station is coupled to a terrestrial network.

1   10.   A system as recited in claim 9, wherein said terrestrial
2 network comprises the Internet.

1   11.   A system as recited in claim 9, wherein the terrestrial
2 network comprises the public service telephone network.

1   12.   A communications system, comprising:
2   a ground station having;
3   a beam generator for generating a plurality of beam control
4 signals,
5   a digital beam former circuit receiving the beam control signals
6 and generating a plurality of first element control signals having adaptive
7 interference rejection in response to the beam control signals,
8   a multiplexer multiplexing the first element control signals, and
9   an RF subsystem for communicating an RF signal corresponding
10 to the first element control signals;
11   a stratospheric platform having;
12   a payload receiver for receiving the RF signals,
13   a demultiplexer demultiplexing the RF signals into a second
14 plurality of element control signals corresponding to the first element control

15   signals and generating a plurality of beams in response to the second plurality of
16   element control signals.

1   13.   A system as recited in claim 12, wherein said ground
2   station comprises a gateway station.

1   14.   A system as recited in claim 12, wherein said ground
2   station is coupled to a terrestrial network.

1   15.   A system as recited in claim 14, wherein said terrestrial
2   network comprises the internet.

1   16.   A system as recited in claim 15, wherein the terrestrial
2   network comprises the public service telephone network.

1   17.   A system as recited in claim 12, wherein a digital beam
2   former circuit having a digital beam former, an adaptive beam processor
3   coupled to user position files, said digital beam former circuit coupled to the
4   beam generator, the digital beam former generates a plurality of element control
5   signals, said adaptive beam processor generating said adaptive interference
6   rejection.

1   18.   A method of controlling a communications system
2   having a stratospheric platform with a phased array antenna with a plurality of
3   elements, said method comprising the steps of:

1   19.   A method as recited in claim 18 wherein said step of
2   forming comprises the step of estimating interference on a first beam from a
3   second beam.

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20.   A method as recited in claim 19 wherein said step of forming comprises the step of estimating interference values from user position values and creating said adaptive interference rejection by subtracting interference values from the plurality of beams.